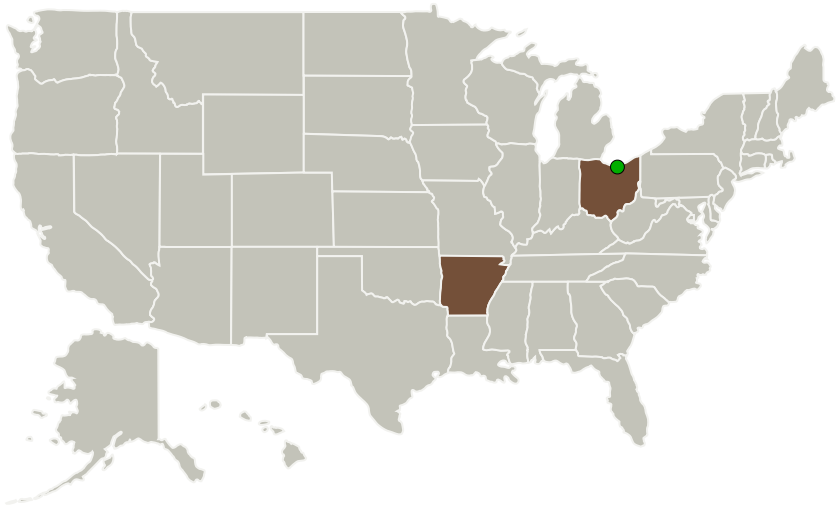
Development of a Novel, Ultra-Low SWAP, RAD-Tolerant, Multi-Channel, Reprogrammable Photonic Integrated Circuit Optical Transceiver Module, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

According to Topic O1, titled Space Communications, "NASA's communications capability is based on the premise that communications shall enable and not constrain missions. Communications must be robust to support the numerous missions for space science, Earth science and exploration of the universe. Technologies such as optical communications, RF including antennas and ground based Earth stations, surface networks, access links, reprogrammable communications systems, communications systems for EVAs, advanced antenna technology, transmit array concepts and communications in support of launch services including space based assets are very important to the future of exploration and science activities of the Agency. Emphasis is placed on size, weight and power improvements. Innovative solutions centered around operational issues associated with the communications capability are needed. These technologies are to be aligned with the Space Communications and Navigation Architecture (SCaN)." Therefore, SPI proposes to develop a novel, ultra-low SWAP, multichannel, photonic integrated circuit (PIC) based optical transceiver for data rates up to 10Gbps per channel. It will be designed specifically for the AS1393a networking architecture demonstration; but, may easily be modified, via a change in the protocol/processing FPGA VHDL core, to suit a multitude of high-speed optical networking applications relevant to the NASA SCaN Internet Architecture Vision.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Space Photonics, Inc.	Lead Organization	Industry	Fayetteville, Arkansas
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Arkansas	Ohio

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138091)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Space Photonics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

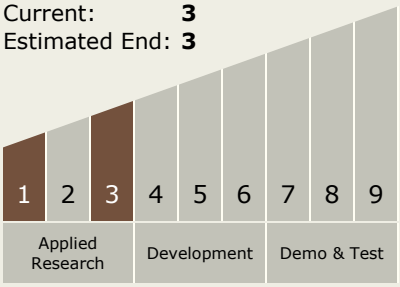
Carlos Torrez

Principal Investigator:

Matthew Leftwich

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.6 Innovative Antennas

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System